

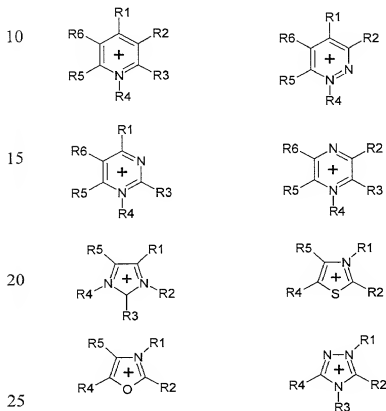
Claims

1. An ionic liquid of the general formula



wherein:

K^+ is a cation selected from:



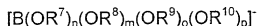
wherein

R^1 to R^6 are identical or different and are each individually

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| 30 | - H, |
| | - a halogen, |
| 35 | - an alkyl radical (C_1 to C_8), which is unsubstituted, or which is partially or fully substituted by F, Cl, $N(C_nF_{(2n+1-x)}H_x)_2$, $O(C_nF_{(2n+1-x)}H_x)$, $SO_2(C_nF_{(2n+1-x)}H_x)$ or $C_nF_{(2n+1-x)}H_x$ wherein $1 < n < 6$ and $0 < x \leq 13$ |

- a phenyl radical which is unsubstituted or which is partially or fully substituted by F, Cl, $N(C_nF_{(2n+1-x)}H_x)_2$, $O(C_nF_{(2n+1-x)}H_x)$, $SO_2(C_nF_{(2n+1-x)}H_x)$ or $C_nF_{(2n+1-x)}H_x$ wherein $1 < n < 6$ and $0 < x \leq 13$
- 5 - one or more pairs of adjacent R^1 to R^8 can also be an alkylene or alkenylene radical and having up to 8 C atoms, wherein the radical is unsubstituted or partially or fully substituted by halogen, $N(C_nF_{(2n+1-x)}H_x)_2$, $O(C_nF_{(2n+1-x)}H_x)$, $SO_2(C_nF_{(2n+1-x)}H_x)$ or $C_nF_{(2n+1-x)}H_x$ wherein $1 < n < 6$ and $0 < x \leq 13$

10 wherein A^- is an anion selected from



wherein

15 $0 \leq n, m, o, p \leq 4$, and $m+n+o+p=4$, and

R^7 to R^{10} are different or identical and are each, individually:

an aromatic ring selected from a phenyl, naphthyl, anthracenyl and phenanthrenyl ring, which is unsubstituted, or which is monosubstituted or polysubstituted by $C_nF_{(2n+1-x)}H_x$, wherein $1 < n < 6$ and $0 < x \leq 13$, or halogen,

an aromatic heterocyclic ring selected from a pyridyl, pyrazyl and pyrimidyl ring, which is unsubstituted, or which is monosubstituted or polysubstituted by $C_nF_{(2n+1-x)}H_x$, wherein $1 < n < 6$ and $0 < x \leq 13$, or halogen, or

an alkyl radical (C_1 to C_8), which is unsubstituted, or which is partially or fully substituted by F, Cl, $N(C_nF_{(2n+1-x)}H_x)_2$, $O(C_nF_{(2n+1-x)}H_x)$, $SO_2(C_nF_{(2n+1-x)}H_x)$, or $C_nF_{(2n+1-x)}H_x$, wherein $1 < n < 6$ and $0 < x \leq 13$

and wherein one or more pairs of R^7 to R^{10} can also form

an aromatic ring selected from a phenylene, naphthylene, anthracenylene and phenanthrenylene ring, which is unsubstituted or which is monosubstituted or polysubstituted by $C_nF_{(2n+1-x)}H_x$, wherein $1 < n < 6$ and $0 < x \leq 13$, or halogen,

an aromatic heterocyclic ring selected from a pyridylene, pyrazylene and pyrimidylene ring, which is unsubstituted, or which is mono-substituted or polysubstituted by $C_nF_{(2n+1-x)}H_x$, wherein $1 < n < 6$ and $0 < x \leq 13$, or halogen, or

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an alkylene or alkenylene radical having up to 8 C atoms and which is unsubstituted or which is partially or fully substituted by halogen, $N(C_nF_{(2n+1-x)}H_x)_2$, $O(C_nF_{(2n+1-x)}H_x)$, $SO_2(C_nF_{(2n+1-x)}H_x)$ or $C_nF_{(2n+1-x)}H_x$ wherein $1 < n < 6$ and $0 < x \leq 13$

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or OR^7 to OR^{10} ,

individually or together, are an aromatic having 6 to 14 C atoms or are aliphatic having 1 to 6 C atoms and which is a carboxyl, dicarboxyl, oxysulfonyl or oxycarbonyl radical, which is unsubstituted, or which is partially or fully substituted by F, Cl, $N(C_nF_{(2n+1-x)}H_x)_2$, $O(C_nF_{(2n+1-x)}H_x)$, $SO_2(C_nF_{(2n+1-x)}H_x)$ or $C_nF_{(2n+1-x)}H_x$, wherein $1 < n < 6$ and $0 < x \leq 13$.

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2. An ionic liquid according to claim 1, wherein at least one of R^1 to R^6 of the cation is an alkyl radical which is unsubstituted or partially or fully substituted by F, Cl, $N(C_nF_{(2n+1-x)}H_x)_2$, $O(C_nF_{(2n+1-x)}H_x)$, $SO_2(C_nF_{(2n+1-x)}H_x)$ or $C_nF_{(2n+1-x)}H_x$ wherein $1 < n < 6$ and $0 < x \leq 13$

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3. An ionic liquid according to claim 1, wherein at least one of R^1 to R^6 of the cation is a phenyl radical which is unsubstituted or partially or fully substituted by F, Cl, $N(C_nF_{(2n+1-x)}H_x)_2$, $O(C_nF_{(2n+1-x)}H_x)$, $SO_2(C_nF_{(2n+1-x)}H_x)$ or $C_nF_{(2n+1-x)}H_x$ wherein $1 < n < 6$ and $0 < x \leq 13$.

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4. An ionic liquid according to claim 1, wherein at least a pair of R^1 to R^6 of the cation is an alkylene or alkenylene radical which is unsubstituted or partially or fully substituted by halogen, $N(C_nF_{(2n+1-x)}H_x)_2$, $O(C_nF_{(2n+1-x)}H_x)$, $SO_2(C_nF_{(2n+1-x)}H_x)$ or $C_nF_{(2n+1-x)}H_x$ wherein $1 < n < 6$ and $0 < x \leq 13$.

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5. An ionic liquid according to claim 1, wherein at least one of R^7 to R^{10} of the anion is an alkyl radical which is unsubstituted or partially

or fully substituted by F, Cl, $N(C_nF_{(2n+1-x)}H_x)_2$, $O(C_nF_{(2n+1-x)}H_x)$, $SO_2(C_nF_{(2n+1-x)}H_x)_x$, or $C_nF_{(2n+1-x)}H_x$, wherein $1 < n < 6$ and $0 < x \leq 13$.

- 5 6. An ionic liquid according to claim 1, wherein at least one pair of R^7 to R^{10} of the anion is an alkylene or alkenylene radical which is unsubstituted or partially or fully substituted by a halogen, $N(C_nF_{(2n+1-x)}H_x)_2$, $O(C_nF_{(2n+1-x)}H_x)$, $SO_2(C_nF_{(2n+1-x)}H_x)_x$ or $C_nF_{(2n+1-x)}H_x$ wherein $1 < n < 6$ and $0 < x \leq 13$.
- 10 7. An ionic liquid according to claim 1, wherein at least one of R^7 to R^{10} of the anion is an aromatic ring selected from a phenyl, naphthyl, anthracenyl and phenanthrenyl ring, which is unsubstituted, or which is monosubstituted or polysubstituted by $C_nF_{(2n+1-x)}H_x$, wherein $1 < n < 6$ and $0 < x \leq 13$, or by a halogen.
- 15 8. An ionic liquid according to claim 1, wherein at least one of R^7 to R^{10} of the anion is an aromatic heterocyclic ring selected from a pyridyl, pyrazyl and pyrimidyl ring, which is unsubstituted, or which is monosubstituted or polysubstituted by $C_nF_{(2n+1-x)}H_x$, wherein $1 < n < 6$ and $0 < x \leq 13$, or by a halogen (F, Cl or Br).
- 20 9. An ionic liquid according to claim 1, wherein at least one pair of R^7 to R^{10} of the anion is an aromatic ring selected from a phenylene, naphthylene, anthracenylene and phenanthrenylene ring, which is unsubstituted or which is monosubstituted or polysubstituted by $C_nF_{(2n+1-x)}H_x$, wherein $1 < n < 6$ and $0 < x \leq 13$, or halogen.
- 25 10. An ionic liquid according to claim 1, wherein at least one pair of R^7 to R^{10} of the anion is an aromatic heterocyclic ring selected from a pyridylene, pyrazylene and pyrimidylene ring, which is unsubstituted, or which is monosubstituted or polysubstituted by $C_nF_{(2n+1-x)}H_x$, wherein $1 < n < 6$ and $0 < x \leq 13$, or by halogen.
- 30 11. An electrochemical cell comprising a cathode, an anode, a separator, and the ionic liquid of claim 1.
- 35 12. A supercapacitor comprised of at least a pair of electrodes, a separator, and the ionic liquid of claim 1.

13. An electrolyte composition comprising an ionic liquid of claim 1 and an aprotic solvent.

5 14. An electrolyte composition comprising an ionic liquid of claim 1 and a conductive salt.

15. A method for making an ionic liquid according to claim 1, comprising reacting a chloride salt of the formula K^+Cl^- with a lithium salt of the formula Li^+A^- within an aprotic solvent.

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